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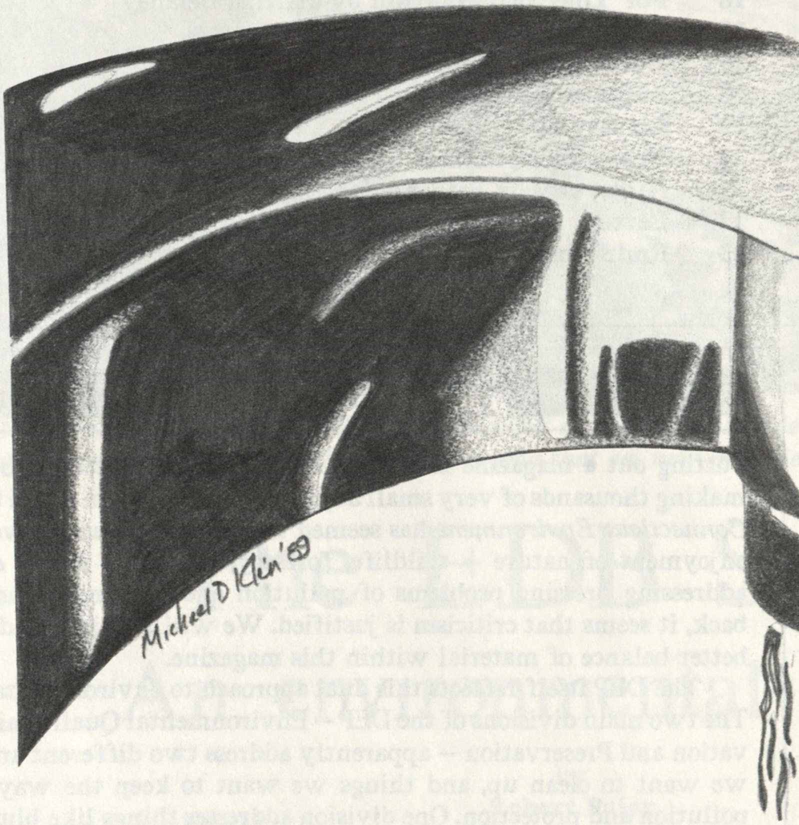

THE EDB STORY

AN ENVIRONMENTAL DRAMA

CONNECTICUT
ENVIRONMENT

July/August 1989
Volume 16 Number 11
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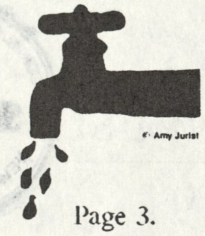

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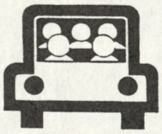

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Cover by Michael D. Klein

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Editor's Note

Putting out a magazine is a lot like flying a helicopter – you do it by making thousands of very small adjustments. It has been noted that lately *Connecticut Environment* has seemed to emphasize stories involving the enjoyment of nature -- wildlife, forestry, fishing -- at the expense of addressing pressing problems of pollution and contamination. Looking back, it seems that criticism is justified. We will readjust, and aim for a better balance of material within this magazine.

The DEP itself reflects this dual approach to environmental matters. The two main divisions of the DEP – Environmental Quality and Conservation and Preservation – apparently address two different areas: things we want to clean up, and things we want to keep the way they are; pollution and protection. One division addresses things like bluebirds and mountain trails, the other nuclear waste and polychlorinated biphenyls.

These issues are, of course, really one and the same. The message of both is to walk softly, carefully, responsibly through this world, whether our reference point is on a molecular level or on the level of the migration pattern of bald eagles. And we have learned in the 20th century that nothing in the environment is in isolation, nothing is separate. To affect one is to affect all. If you are acting correctly and responsibly in regard to bluebirds, then it must of necessity be true that you are also acting responsibly in regard to nuclear waste.

Our main article this month is on EDB contamination. Perceptive readers will recognize that this article is also about the birds that sing in the trees, the animals that live in the wild, and the wildflowers that grace quiet and lonely mountain trails.

R.P.

In 1984, in the course of doing a routine survey, the DEP discovered pesticide contamination in Connecticut's tobacco valley. What followed was a long environmental drama that set new precedents in the state.

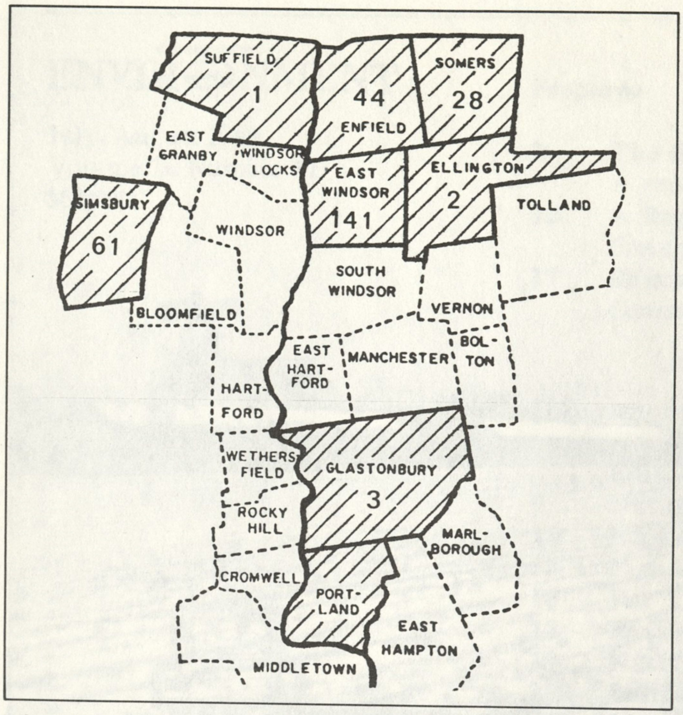
The EDB Story

An environmental drama

by
Robert Paier

WHAT HAPPENS WHEN, QUITE SUDDENLY, you find that the fresh, clear drinking water that you and your family have taken for granted has been contaminated by the chemicals of 20th century science? That is the nightmare of the decade, and – we may be sure – of future decades. That nightmare came true for a small number of residents of the clean, beautiful, environmentally conscious state of Connecticut. It was not a hypothetical scenario off in some dark, looming future, but it was right now. And it demanded a real, not hypothetical, solution.

The Connecticut Department of Environmental Protection, in a far-reaching, cooperative effort that involved breaking new legislative ground, finding new methods to protect water, and coming up with new ideas, has indeed faced up to a serious incident of groundwater contamination. And, with the intelligence, good will, and flexibility of private citizens and homeowners, of state and local agencies, of elected officials, and of private industry, the crisis has been met. The citizens of Connecticut can be confident that the water they drink is safe, clean, and healthy. In this article, we will look at an environmental crisis in Connecticut and how it was met. It is the hope of the DEP, and without doubt of everyone involved in this drama, that what has been learned will be helpful when – not if – similar future problems arise.



The eight-town area of Connecticut's "Tobacco Valley". While EDB was applied in all of these towns, the town of Portland was a special situation in that no contamination was found there. The figures represent the number of wells which were contaminated in each town.

THE STORY OF THIS ENVIRONMENTAL CRISIS began in February, 1984, when members of the DEP's Pesticide Control Unit were doing a special survey of wells in Connecticut's "tobacco valley."

"At that time," said the DEP's Assistant Deputy Commissioner Robert Moore, "there was a growing national awareness of the health hazards associated with ethylene dibromide (EDB) in grains and cereals. In response to that awareness," continued Moore, "the DEP's Pesticide Control Unit began to check where EDB had been used in Connecticut, and to monitor wells in those areas."

The DEP's Water Compliance Unit became involved and a systematic sampling process was laid out. Water samples were tested at the Connecticut Agricultural Experiment Station in New Haven. According to Paul Ritsick, principal sanitary engineer of the Connecticut Department of Health Services, nothing unusual was expected. "The ironic thing," says Ritsick, five years later, "is that when the investigation began, we just didn't think we'd find any contamination." But find it they did. And at that point, there was reason to question whether or not the drinking water was safe.

EDB, was the main character in the environmental drama that was starting to unfold. EDB, or 1,2-dibromethane, or ethylene dibromide, was developed in the 1940s to control nematodes in the soil. It was used extensively by the tobacco industry. Where it was used, it was applied at the rate of four to six gallons per acre. While it is applied only to the top layer of the soil, with rain the chemical percolates down through the soil, eventually reaching the water table. At that point, the chemical mixes with the groundwater. Then, the chemical is in a much diluted state, and it moves with the natural flow of groundwater. Once in the groundwater, the EDB may retain its identity for about 30 years or more.

At this time, it is estimated that 4560 water samples have been collected from 2500 private and public water supply wells since the investigation began. And monitoring continues. At the concentration now existing in the groundwater, EDB poses no short term risks. In other words, if you drink plain tap water in the towns of Connecticut's tobacco valley, you won't get sick. The danger, however, involves long-term risk. Studies point to a risk of cancer as a result of long-term consumption.

Because of this risk, the Connecticut Department of Health Services has established a limit for the amount of EDB which is acceptable in drinking water. It is significant that, at the time of the crisis, there was no federal or state standard as to an acceptable level of EDB. The level now used, which was in fact adopted after the litigation in this case began, is 0.1 parts per billion. Anything more than that is considered unsafe for drinking or cooking.

For several years, the U.S. Environmental Protection Agency (EPA) has classified EDB as an unacceptable pesticide. The last known application of EDB in Connecticut was in 1983.

THE NEXT STEP," SAID MOORE, "was to identify the players, those responsible for the mess. The first identified were the farmers, who had applied the EDB to the soil. And then the long legal process began." The DEP ordered the farmers, to include Culbro, Consolidated Cigar, and Mulnite, to provide bottled water to the affected households and to pay for the long-term solution and clean-up of the contamination. The farmers did in fact provide payment for the bottled water, but they also appealed the DEP's judgement of their ultimate responsibility.

"In addition to those areas where it was possible to make a determination of responsibility," said Moore, "there were other areas, roughly equivalent in size, where no records were available. In these areas, the state assumed the financial burden of providing bottled water." This financial problem was ultimately resolved through state and municipal cooperation, as well as through the long-term solution of providing a permanent water supply.

SO, THE DEP HAD TO DO TWO THINGS, almost immediately and almost simultaneously. First, it had to find an immediate, short-term solution. And second, it had to determine the extent of the contamination.

The short-term solution was to provide bottled water to the homes affected. For this, the DEP requested the assistance of the Capital Region Council of Governments

(CRCOG). "CRCOG has provided the best service I have ever seen from any government agency," said Moore. "The ultimate resolution of this crisis is largely due to their efficiency and assistance."

CRCOG is, according to Program Coordinator Mel Simpson, "a mid-level agency, falling between the state and municipal level. CRCOG functions as a comprehensive planning and management unit, and it does so because the county government is not significant in Connecticut." There are 29 towns in the capitol region, and CRCOG provides tangible, technical assistance in matters affecting the region as a whole. As such, CRCOG was able to provide immediate assistance in contracting, budgeting, and finance. In other words, they were able to get bottled water out to the families who needed it fast.

"This unit is able to respond on an emergency basis," said Michael Cunningham, CRCOG's director of finance. "We had no model for what we were doing. We had to design our own management plan." Cunningham stated that many of the mechanisms needed to provide the bottled water were already in place. "We had to energize and coordinate all these efforts. Ultimately, it was a success story."

According to Simpson, CRCOG was responsible for getting bottled water to 150 homes in the EDB-contaminated area.

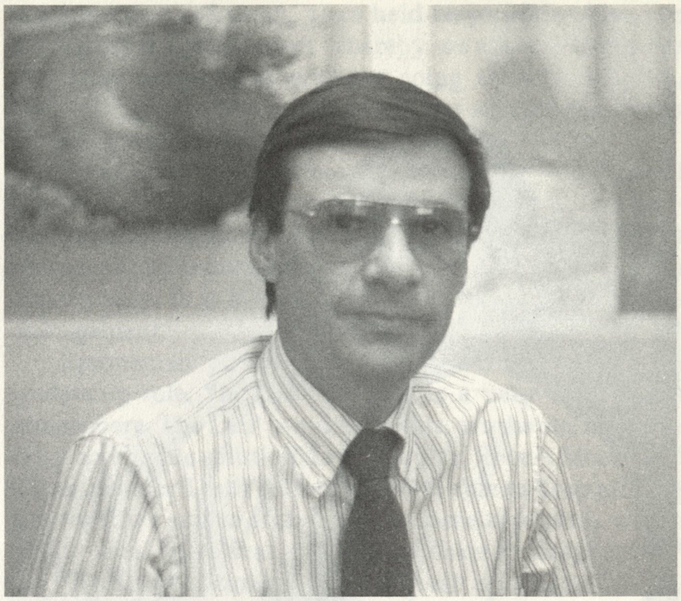
THE SECOND ISSUE was the question of just where the contamination was. This was important in the short term, simply because people wanted to know if it was safe to drink the water coming out of their taps. And, in the long term, the question of liability was far from resolved.

Mapping the contamination was completed by the DEP, the Department of Health Services, and local health departments. "The fact that there was so much cooperation at the local level," said Paul Ritsick, "was good for the whole process."

The process of testing the wells was made more difficult by the fact that a near-panic situation was developing the areas in question. At one point, said Ritsick, the state tested 120 samples in one week, and during the year, 1500 samples were taken and analyzed.

Much of the state's testing was done by the Department of Health Laboratory in Hartford. "Our position," said Mary Lantieri, supervising chemist, "has been to be politically neutral, but scientifically precise." Testing procedures at the lab reflect the cutting edge of modern technology, and can now produce accurate data at the level of parts per trillion.

While the testing and monitoring continue to the present time, it was finally possible to make a fairly precise determination of the extent of the contamination. It was concluded that there had been applications of EDB in the eight-town area of East Windsor, Ellington, Enfield, Glastonbury, Portland, Simsbury, Somers, and Suffield. It is important to note that in the town of Portland no EDB contamination was found.



The DEP's William Hogan, chief engineer, water pollution facilities, was involved in the tense, day to day, negotiations between the state and the responsible parties.

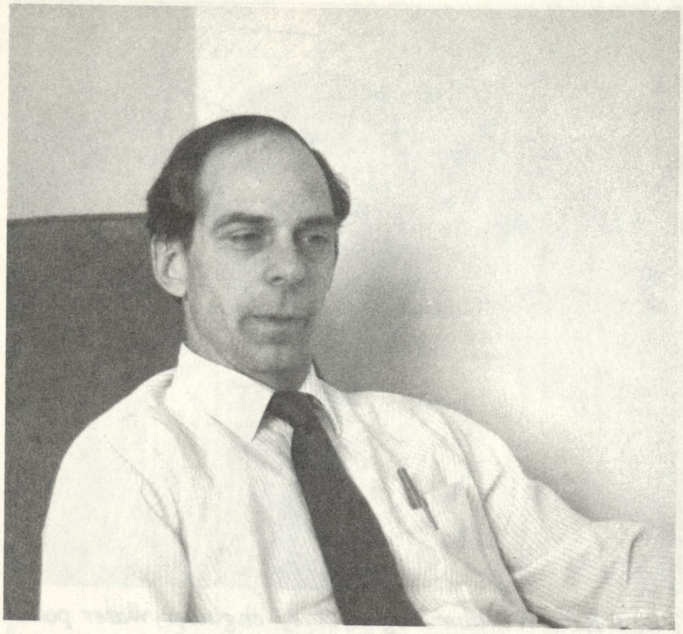
When the investigation was finally completed, it was determined that 215 private wells for single-family residences, affecting 860 people, had been contaminated. A more complex situation was involved in regard to public wells. There was a total of five wells which were used by 25 or more people: the School Hill Water Association, with a total of 120 people; a well serving migrant farm workers, with a total of about 100 people; a church in Enfield, involving from 50 to 100 people; the Village Water Company in Simsbury, serving what William Hogan called "a significant but indeterminate number of people"; and the Oak Street Well in Hazardville. This last well represented a special case in that it had already been shut down for contamination by nitrates when EDB contamination was also found.

HAVING FACED THE CRISIS in the short-term, the DEP then began to look for long-term solutions.

First, what was going to be done to counteract the EDB contamination in the affected wells? And second, who was going to pay for it?

After considering the possiblity of extending a new water main from a public water supply for those with contaminated water (finally rejected in many areas as being economically prohibitive) or even just boiling water prior to consumption, it was decided that a carbon filtration system be tested. Drawing to some extent on a similar system which has been functioning in Florida, engineers from the DEP and the Department of Health Services came up with the system of granular activated carbon filtration.

In one type of filter installation, water is drawn from the contaminated well, and held in a pressure storage tank. There is a sampling tap at that point, making it



Richard Webb of the Office of the State Assistant Attorney General was the attorney of record for the DEP.

possible to test the water prior to filtration. Then follow a water meter, flow restrictor, a carbon filter, another sampling tap, and another carbon filter, and another sampling tap. The water is tested and monitored at three separate points.

In 1985, such a system was installed in one household by Aqua Sentry Filtration Services. Daryl Angeloni, president of the company, maintained that one system on a trial basis until a settlement was reached. "It was clear to me," said Angeloni, "that this system would be effective."

With the research and testing completed, it was decided that granular activated carbon filters were the way to go. Unfortunately, paying for them was another matter, and so while that was being worked out, it was necessary that the residents of homes with contaminated wells continued to be supplied with bottled water. It was an inconvenience they would endure for four years in several affected areas.

HAVING ESTABLISHED THE DEGREE and extent of the EDB contamination, having provided residents with bottled water for their short-term consumption, and having formulated a filter system to deal with the problem in the long-term, the DEP now had to find the parties responsible, to bring legal action against them, and -- it was hoped-- to win the case.

The following corporations were identified as possibly being legally liable: Consolidated Cigar Corporation, MacAndrews and Forbes Holdings, Inc., Simon and Schuster Inc., and Gulf and Western, Inc.; Culbro Corporation; and Mulnite Farms were the farming entities which had originally applied EDB to their tobacco fields. The Dow Chemical Company and FMC Corporation were identified as the manufacturers of the EDB which was applied to those fields. On the whole, these were big corporations. They had ready access to legal counsel, and certainly used it. Very serious legal issues of environmental responsibility were now to be addressed.

THE ATTORNEY OF RECORD for the DEP was Richard Webb of the Office of the State Assistant Attorney General. It was Webb's job to clarify subtle aspects of the law, to discuss applications of that law in this particular situation, and to assist with what Webb calls "the legal language." As such, Webb was present at meetings in which all parties were involved. "This was a complex situation," said Webb, "and time was a factor. It took a long time to find the responsible parties, and a lot of time to do the negotiating."

The day to day, front-line negotiating was done by William Hogan, chief engineer, water pollution control facilities, and Elsie Patton, principal environmental analyst, both of the DEP's Water Compliance Unit.

Hogan smilingly describes his role as "the DEP's Henry Kissinger." Hogan, like everyone involved in the matter, was keenly aware of the importance of every step taken. "We knew that serious issues were involved. It was a very high-stakes atmosphere. I was given a lot of latitude by the DEP. Robert Moore expressed a lot of confidence in allowing me to make fast decisions. That was the only way I would have been able to respond to the offers and counter-offers as they were made."

On the other hand, it became evident that the farmers and chemical companies were clearly concerned about the impacted homeowners. "At all times," said Robert Moore, "the attorneys for the corporations, and notably Attorneys Brenneman and Kosloff, were instrumental in bringing about a fair and equitable resolution of this matter."

Russell Brenneman, a respected environmentalist, frequently at the forefront of environmental issues in Connecticut, is the Connecticut counsel for Dow Chemical Corporation. "From the beginning," said Brenneman, "Dow took a leadership position in contributing to the settlement. In addition to financial contributions, Dow also made the considerable technical expertise at its disposal available to the DEP, as well as making all the data relative to the EDB application immediately available."

So, while it was clear that all parties had the ultimate good of the environment in their hearts, money was also involved. For that reason, very delicate negotiations continued for almost four years. "It was an exciting, and very exhausting period of shuttle diplomacy," said Hogan.

Finally, in March of 1988, an agreement was reached. Everybody signed on the dotted line. What resulted from those years of long negotiation was a settlement of unique and precedent-setting value.

A BRIEF OVERVIEW OF THE SETTLEMENT is as follows: The settlement identifed the towns involved, the nature of the contaminant, and the contributors, or responsible parties. It stated that carbon filtration was the the most cost-effective means of dealing with the problem. It did not, however, rule out the possibility of extending public water mains. The settlement further indicated that the contributors had made a diligent search of all their records, and that a full disclosure had been made of all use of EDB.

The settlement established two funds, Fund A and Fund B, to provide potable water, testing, and long-term remediation. Fund A is to be used for remedial activities needed for existing wells at the time of the settlement, and Fund B is to be used for remedial activities at wells constructed after the date of the settlement. The two funds will be utilized primarily to support the cost of either carbon filtration or provision of public water to contaminated wells. The settlement goes on to specify that all responsible parties will make two payments each into each of the two funds. The complete schedule of payments as specified in the settlement is as follows:

	FUND A First Payment (1988 $'s)	FUND A Second Payment (1993 $'s)
Dow	255,750.00*	664,357.50
FMC	255,750.00*	664,357.50
Culbro	45,916.81	119,277.32
Consolidated Cigar	81,029.65	210,489.36
Mulnite	9,453.41	24,556.96
	FUND B First Payment (1988 $'s)	**FUND B Second Payment (1993 $'s)**
Dow	14,250.00	165,536.25
FMC	14,250.00	165,536.25
Culbro	2,558.41	29,720.02
Consolidated Cigar	4,514.85	52,447.09
Mulnite	526.73	6,118.79

* Dow and FMC have each made advance payments of $12,500.00 which shall be credited toward their first Fund A payments.

THE SETTLEMENT WAS SUCH that even though the contributing corporations agreed to bear the cost of the remedial action, there was no formal, legal admission of liability. This was the key point. Possibly years of litigation were avoided and, more importantly, a very workable system was reached by which similar problems could be addressed in the future. An important precedent had been set in environmental dispute management.

"A number of very significant things resulted from this," said Richard Webb. "First, the manufacturers, and not just the applicators, were held responsible. Also, we have created a mechanism whereby we are able to resolve this kind of problem without going through lengthy, costly litigation. The groundwork for similar resolution in the future has been established."

"Dow felt this settlement was fair," said Russell Brenneman. "We are now assured of dealing with a serious environmental problem without long litigation. This precedent can be invoked wherever there is an appropriate opportunity. It is a first of its kind solution in dispute management."

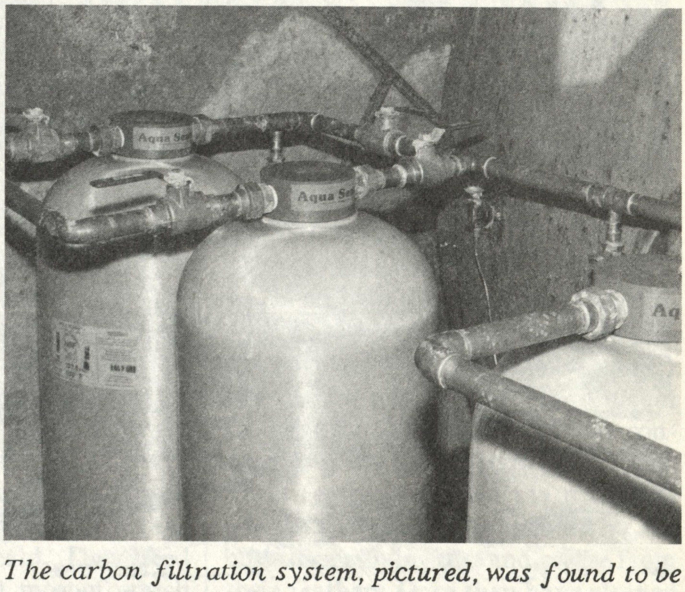
Brenneman went on to credit the DEP for taking a leadership role. "It took that role in a very high-stakes atmosphere. The DEP provided a fair, workable, and mutally acceptable solution. In particular, Robert Moore and Commissioner Leslie Carothers were able to keep all parties together and working in the same direction, where many times there was a danger of them drifting apart."

"The negotiations were difficult and sensitive because there were no ground rules," recalls Bill Hogan. "There were new challenges each day. The DEP was working for the citizens of the state, and the lawyers had to represent the interests of their clients, the big corporations. I think the settlement was a good one."

And so in March, 1988, almost four years after the initial discovery of the EDB, the filters began to be installed. The job was taken on by Daryl Angeloni of Aqua Sentry, involved in the project from the beginning. Angeloni also monitors the filter systems and has developed a very close rapport with the residents who depend on the systems. "I am convinced this is the right solution to the problem," he says. "I have a personal commitment to these people and to insuring the water they drink is healthy."

AND WHAT ABOUT THE RESIDENTS? What do they think?

Mrs. Elaine Perrone is secretary-treasurer of the



The carbon filtration system, pictured, was found to be most cost-effective, long-term solution to EDB contamination.

School Hill Water District in East Windsor. This is one of the larger public water systems in the state in which a granular activated carbon filtration system is in operation. About 100 people are involved. "I find no difference in the water pressure or quality from before to now. I do feel the DEP is responding to the problem as well as it can, and I feel secure that I can use this water and not worry about it." Like many others, however, Mrs. Perrone finds it difficult to think in terms of something which is measured in parts per billion.

Mr. Richard DelConte of Broad Brook commended the DEP for "staying on top of the problem and providing a much needed service."

Robert and Jean Russell of Broad Brook expressed appreciation to the DEP for "dedication and efforts to protect our water resources."

While almost every one contacted in regard to this program had only praise for the DEP and its representatives, there was a minority opinion. Roland Rychling of Brook Brook has been an outspoken opponent of the DEP's handling of the situation, and indicated that while he is "still bitter," he has learned to live with it all.

There have been indications that the use of the filter system tends to reduce water pressure. The DEP has made available devices which people can install in their sinks and showers. These devices will both conserve water and maintain high water pressure. Bill Hogan says they are free upon request.

SO THE LONG ENVIRONMENTAL DRAMA is winding to a close. A crisis has been recognized, met straightforwardly, and resolved. "I am very satisfied with the conclusion of this project," said Richard Webb. "The resolution reflects responsible action on the part of all concerned. This will accomplish what it is supposed to do, which is to provide clean drinking water to the citizens of Connecticut."

Of all the people involved in this story, probably no one has a more comprehensive and detailed understanding than does Robert Moore. Moore has been involved in it from the beginning, and in all the complexities, intricacies, and details right up to the end. "There were a number of very important implications of the final settlement," said Moore. "The first is that we have set up a process which assures that the people of Connecticut can be protected, now and in the future, from this kind of environmental crisis. A mechanism is now in place to address a source of long-term pollution.

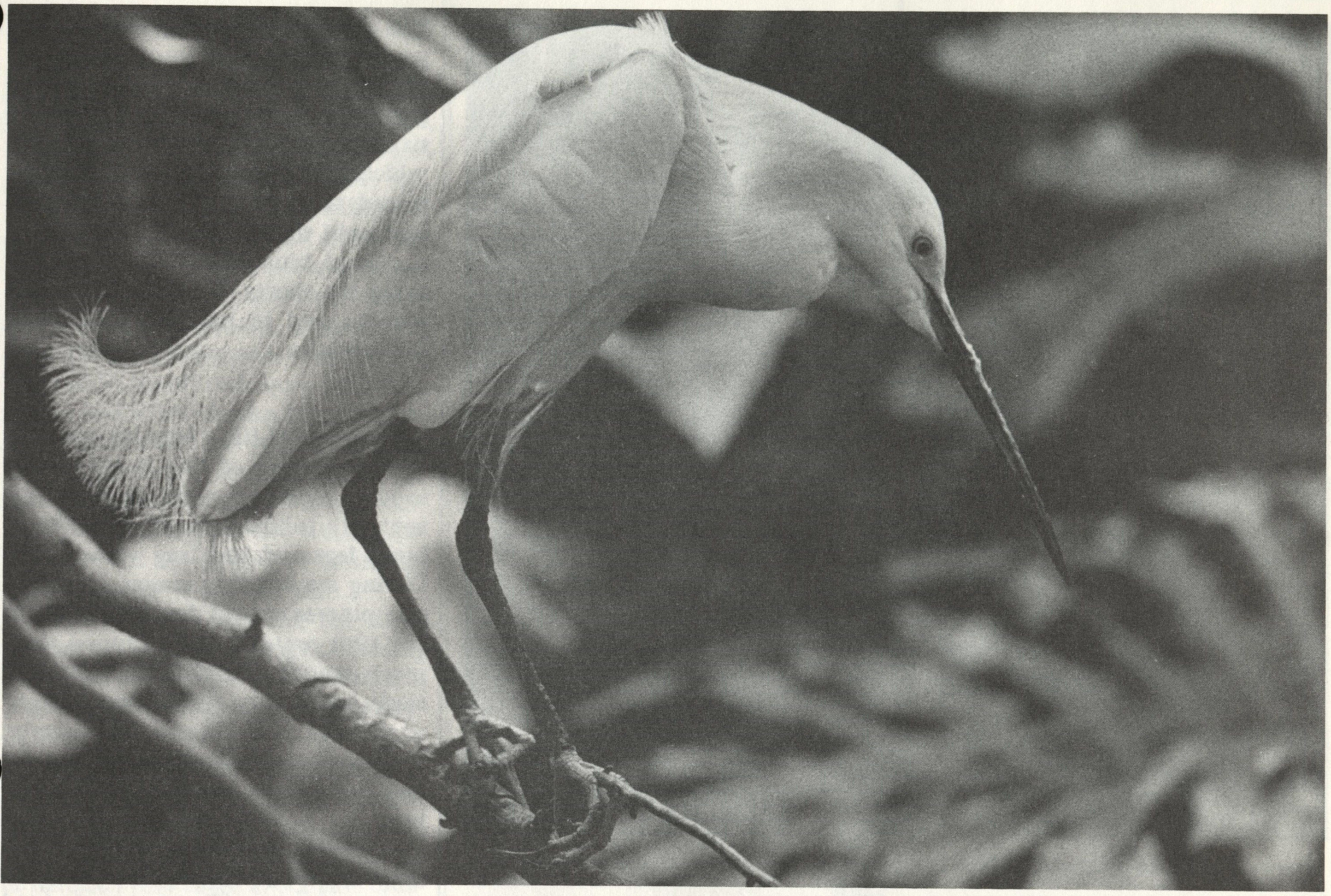
"Secondly, we have firmed up a kind of partnership between the manufacturer and the farmer, making it in the best interests of both to work responsibly and together." Moore went on to describe that now, by following correct management practices, the farmer may limit his future liablity. One result of the EDB story is that the liablity of the farmer and the manufacturer are very clearly spelled out.

"Another implication of the settlement is that now we have a better mechanism to respond to future emergencies. We will be able to set up safety procedures in a timely and efficient manner.

"And finally, I believe we have demonstrated that it is both possible and necessary that all levels of government work together in a spirit of cooperation to achieve a common goal. In particular, Bill Hogan and Elsie Patton should be congratulated for inspiring the confidence of Connecticut's citizens. All members of the DEP involved in this had to work beyond the call of duty."

AN ENVIRONMENTAL CRISIS has been met, and solutions have been reached. The people of Connecticut have clean, safe drinking water. The triumph is that clean drinking water has been protected. The tragedy is that it is no longer something we can take for granted. ■

Daryl Angeloni, of Aqua Sentra Filtration Services, took on the job of installing and maintaining the carbon filters. He is one of the scores of people who have worked to ensure that Connecticut residents have clean and safe water.



Snowy egret. The long delicate plumes were once sought by the millinery trade and brought this bird to the edge of extinction. (*Photos: L.L. Rue III.*)

The Birds of the Water's Edge

by

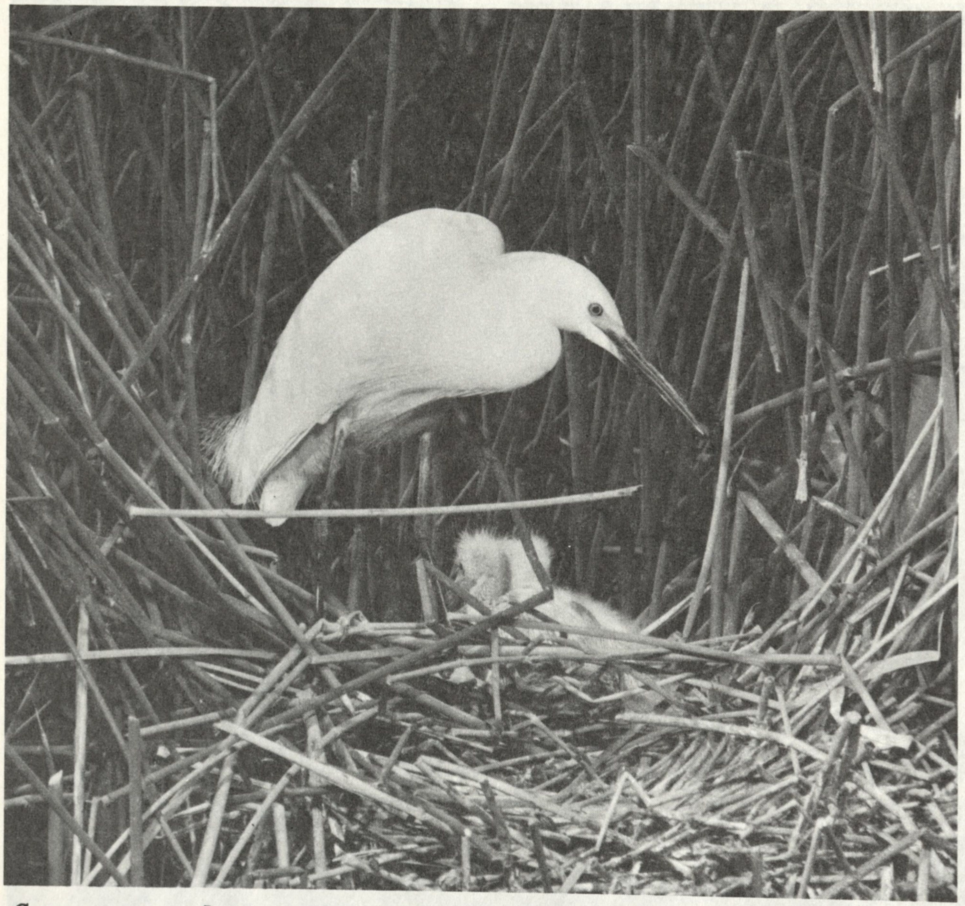
Penni Sharp

SUMMERTIME provides many opportunities for observing birds; summer is the time to be outdoors, near the water. Boaters, swimmers, and others who frequent fresh and salt water shores may catch sight of a variety of birds at water's edge. Summer is the time to see the striking, long-legged members of the heron family, many of which nest in or visit Connecticut during summer.

Herons and bitterns belong to the family *Ardeidae*, which includes over 60 species of birds. Members of this family are long-necked, long-billed, long-legged birds with large wings. Anyone who has observed herons in flight has probably noticed that they hold their necks in an "S" shaped curve. This is because their neck vertebrae are of different lengths.

Herons are cosmopolitan birds, meaning that they are found on all the continents of the world. They feed chiefly on animal food, most of which is aquatic. The heron diet includes fish, amphibians, crustaceans, insects, and reptiles.

Many of the herons display elaborate plumes during the breeding seasons. They are also known for their powder downs. These are unusual feathers that are never shed but continue to grow throughout a bird's life. These feathers wear at the tip into a powdery substance that is used by the birds in removing dirt and grease from their feathers. Once they have cleaned their feathers with powder down,



Snowy egret and young. This bird is most likely to be seen around salt marshes.

herons will waterproof them using oil from the uropygial gland.

IN CONNECTICUT, quite a number of the members of this bird family can be seen during summer months. Perhaps the most striking of all is the majestic great blue heron.

The great blue heron (*Ardea herodias*) is the largest and probably the most ubiquitous of the American herons. It is bluish gray with a yellow bill and mostly white head. The stately presence of the great blue heron when poised motionless at water's edge has made it a popular subject for artists and photographers. The great blue can remain still for a seemingly endless time, concentrating on its search for prey. A quick dart of the head and strike of the bill and a small fish or frog is seized. The vigil is then resumed. Even in flight, the great blue maintains its dignified appearance as it moves with slow, deliberate flaps of its large wings.

The great blue heron is a migratory species. During mild winters, a few stragglers may remain in Connecticut; however, the herons usually winter further to the south and return to their breeding ranges early in the spring. Courtship among the great blue herons is a spectacular event in that a number of herons may congregate. A ritual dance is performed by the herons, who move around one another in a circular pattern with wings outstretched. Occasionally, males will fight each other in a contest over a particular female.

Great blue herons nest in colonies and prefer to locate their nests in trees where available. The nests are large platforms constructed of sticks and only slightly hollowed. They appear to be rather precarious structures for the hatching of eggs. Both male and female birds incubate the pale green eggs, which usually number four to five and hatch in about 28 days. The young birds are helpless and ungainly. They are tended by both parents who feed them soft regurgitated food initially and later bring them solid food which is deposited in the nest. If undisturbed, the young will remain in the nest until they reach adult size.

Great blue herons can be found along the shores of ponds, lakes, and streams, and in marshes throughout Connecticut.

A SMALLER, equally graceful member of this family is the snowy egret (*Egretta thula*). This snow white bird is distinguished by its black legs and startling yellow feet. During the breeding season, long delicate plumes extend down its back. In the 19th century, these plumes were much sought after for the millinery trade, and snowy egrets were brought to the edge of extinction. Fortunately, they were afforded protection in time and have since increased their numbers.

During courtship, snowy egrets display their plumes to attract and later to greet a mate. The crest on the head and the plumes of breast and back are elevated and spread, and the wings are held open. Males become quite aggressive, and spats are common.

Like the great blue heron, the snowy egret is a migrant and a colonial nester, and it too builds a stick nest of rather flimsy construction. Four to five bluish green eggs are laid, and both parents share in the incubating. Eggs hatch in 18 days. The young are fed reguirigitated food and after several weeks leave the nest to perch on twigs of a nearby branch during the day, returning to the nest a night.

Snowy egrets are most likely to be seen around salt marshes where they can be observed actively searching for minnows and small crustaceans.

TWO NIGHT HERONS can be seen in Connecticut, the black-crowned (*Nycticorax nycticorax*) and the yellow-crowned (*Nycticorax violacea*). The black-crowned night heron is a medium-sized, stocky bird. The crown of its head and back are black, wings gray, and underparts white. It has a thick, dark bill, yellowish legs, and red eyes. During the breeding season, white plumes extend from the back of its head. The yellow-crowned night heron, more solitary and not as common in Connecticut, is less stocky than the black-crowned. A black head, marked by an off-white or yellowish crown and white cheeks, helps to identify this bird. The yellow-crowned has a gray body. Immature birds of both these species are brown and heavily streaked. They are difficult to distinguish, but the yellow-crowned has longer legs and a heavier bill.

As the name implies, the night herons are active at night, feeding mostly at dusk and after. However, it is not unusual to see them during daylight hours.

Both species are colonial nesters, although the yellow-crowned night heron will nest singly. They are often found in rookeries with other species of herons. From three to six pale blue-green eggs are laid and incubated for 21 days. The young usually leave the nest a month or so after hatching, but are not strong fliers until they are around eight weeks old.

Night herons are migratory, and young birds will frequently move out in all directions from their nesting grounds in search of new territory prior to the annual southward migration.

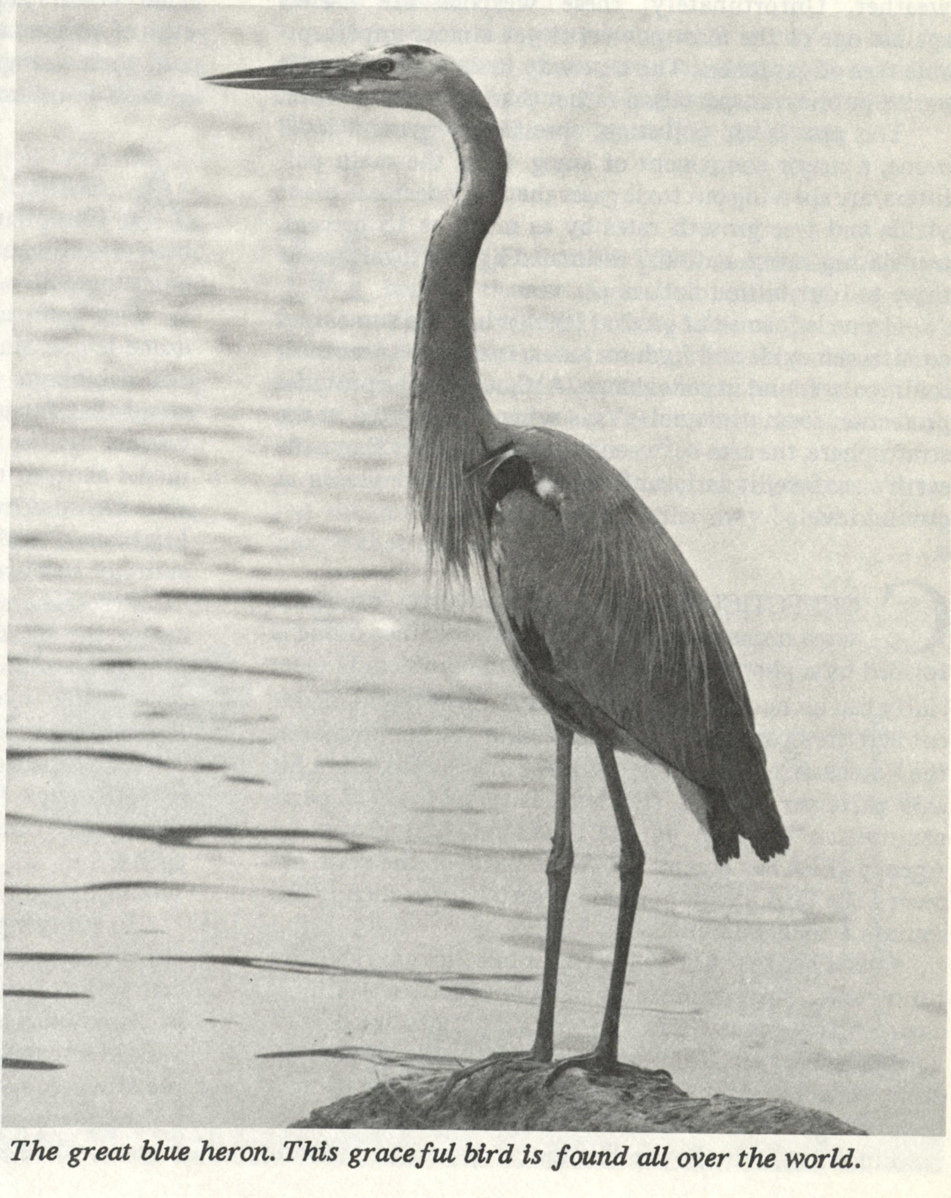
BITTERNS DIFFER from other members of the heron family in several ways. In appearance, they have shorter legs and bills. They are solitary nesters and place their nests on or near the ground. Bitterns inhabit salt or freshwater marshes and are difficult birds to see. They are reluctant to fly, and when disturbed, assume a posture with their necks extended and bill pointed skyward. With their protective coloration, they become next to impossible to spot. On a breezy day, they will even sway with the wind, thus blending in with the waving reeds of the marsh.

The American bittern (*Botaurus lentiginosus*) is a medium-sized, brown streaked heron with black markings down each side of its throat. It is similar to the immature night herons; however, it is a more secretive bird. The black throat markings are a help in identifying the bittern.

Bitterns may be heard more often than seen. During courtship, males emit a strange assortment of mating calls. These odd sounds can carry for half a mile and have given the bittern the names "thunder pumper" and "stake driver."

The female bittern builds the nest, often choosing a dense clump of cattails. The new spring growth of the cattails coincides with the hatch of the young, giving added protection to the vulnerable chicks. From three to seven brownish eggs are laid, incubated by both parents, and hatched in 28 days. The young remain in the nest for several weeks and are fed a diet of regurgitated food. By eight weeks they are ready to fly.

The members of the heron family are fascinating and handsome birds. When you are near the water this summer, be it marsh or shore, keep a lookout for these tall wading birds. ■



The great blue heron. This graceful bird is found all over the world.

Trees, Plants and Connecticut's Air

by

Kirsten Delegarde

Environmental Intern

(On June 12, 1989, President George Bush issued a statement outlining a broad nationwide plan to address the problem of air pollution. In this and future articles, we will discuss the air quality in Connecticut, identify factors which contribute to air pollution, and discuss plans and strategies to improve the health and safety of the air we breathe.)

HOPING FOR A BOUNTIFUL harvest, gardeners arm themselves with everything from watering cans to bowls of beer for battling insects, bacteria, and weather. Unfortunately, these weapons are useless against one of the most powerful yet almost imperceptable foes of gardeners. The best way to defeat this pest is to ride public transportation rather than your car to work.

The pest is air pollution, specifically ground level ozone, a major component of smog. Cars, the main polluters, are spewing out toxic gases that may decrease plant yields and tree growth rates by as much as 15 percent, translating into a national estimated agricultural loss of three to four billion dollars per year.

Ozone is formed at ground level when the sun shines on nitrogen oxide and hydrocarbons, two substances most commonly found in car exhaust. Although ozone provides protection from ultraviolet rays when it is located in the stratosphere, the area between nine and 30 miles above the earth's surface, it is harmful to humans and plants at ground level.

CONNECTICUT has some of the worst problems with ozone pollution in the nation. Since ozone is formed by a photochemical reaction, the problem is especially bad on hot, sunny summer days. In 1988, Connecticut had the second highest ozone reading of the summer in the Northeast when Middletown's ozone concentration hit .239 parts per million. This level is twice the .112 parts per million level set by the Environmental Protection Agency (EPA) as acceptable. Some parts of the state exceeded the EPA standard as many as 21 times during the course of the summer.

Ozone has been a problem for Connecticut agriculture for decades. Tobacco growing in Connecticut was almost completely wiped out in the 1950s and '60s because of high ozone levels. Until scientists were able to find an ozone-resistant strain, tobacco-growing in the state had been brought to almost a complete standstill.

Since 1981, the Boyce-Thompson Institute for Plant Research, in conjunction with the EPA, has been studying the effects of ozone on wheat, corn, soybeans, and cotton. According to Robert Kohut, a plant pathologist at Boyce-Thompson, the Institute has researched air pollution for 65 years, possibly the longest continuous study of air pollution in the country.

Kohut said that the ozone treatments at the Ithaca Research Institute ranged from half of the normal level of ozone in the outside air to twice as much ozone as the air usually contained. Kohut explained that the variations in levels of ozone were meant to simulate actual levels of ozone in the air. Ozone levels are usually higher during the day after the morning and afternoon rush hours, and then drop down at night. The Ithaca air contains only slightly more ozone than clean air normally would. Even last summer, when ozone levels around the country were soaring, Ithaca did not exceed the EPA standard.

As ozone levels in Connecticut are much higher than Ithaca, Kohut said Connecticut plants are probably producing 10 to 15 percent less than if the air were clean.

However, gardeners should not be looking for sudden declines in their yields this year. Kohut said that over time farmers and gardeners have naturally selected varieties of plants that are ozone resistant. Unfortunately, he said, these varieties may not stand up to drought or disease as well as others.

ACCORDING TO SPOKESMEN from the DEP's Air Compliance Unit, ozone levels in Connecticut have been declining overall because of tighter emission controls on automobiles.

But Connecticut can only do so much to control its ozone levels, since much of it is imported from its southern neighbors. Connecticut is downwind of an ozone cloud that forms in Richmond, Virginia, and builds as it travels up the heavily populated coast. One computer model showed that even if every car and factory in the state closed down, several Connecticut ozone monitoring locations would still exceed the EPA standard during the summer because of ozone from other states.

Researchers around the country are beginning to examine the effects of air pollution on trees as well. Trees are more complicated to study than plants because of their longer life cycles. Dr. William Smith, professor of forestry at Yale and author of *Air Pollution and Trees*, said air pollution stunts tree growth 10 to 20 percent.

Although Smith said that he did not have any evidence that Connecticut trees are having an "acute response" to air pollution, he said "Nobody's looking at what's happening to Connecticut forests in the summer."

In studying trees, damage from air pollution is difficult to isolate from bacterial or insect damage. Each stress can weaken the tree substantially, but it is frequently unclear what actually kills it. One stress could have no visible effects. However, when the tree is faced by multiple stresses, it could sicken and die.

Ozone is not the only airborne threat to plants and trees. Acid deposition, including acid rain, is the result of chemical reaction involving sulfur dioxide and nitrogen oxide emissions from fossil fuel combustion. When these gases from cars, coal burning power plants, and oil burning factories mix with water and oxygen in the air, they form sulfuric acid and nitric acid. The acid molecules become cloud droplets until they are washed out of the air and fall to earth as rain, fog, snow, or dust.

"The rainfall we get in Connecticut is some of the most acidic in the nation," according to United States Geological Survey Hydrologist Kenneth Kulp, who monitors acid rain at five sites in Connecticut in conjunction with the DEP.

Kulp says the average pH of precipitation is about 4.3, a number that has stayed constant since he began monitoring in 1983. Unpolluted rain has a pH of 5.6, meaning Connecticut's rain is ten times more acidic than clean rain.

Connecticut has some of the strictest sulfur emissions standards in the country. Unfortunately, much of the acid deposition in Connecticut blows in from the Ohio River Valley. The state of Ohio produces twice as much sulfur dioxide as all of New England, New York, and New Jersey put together.

Researchers are becoming increasingly interested in the combined effect of acid deposition and ozone on trees and plants. In 1986, Boyce-Thompson began its four-year study of the combined threat to trees using 90 saplings from Northern Maine.

Kohut hopes this information will help explain the mysterious decline of high elevation red spruce forests in the Northeast. At this time, scientists cannot prove that air pollution causes the death of high elevation pine forests. Trees are constantly under many stresses at high elevations, and many other factors may be causing their decline.

"We cannot hope to simulate all the stresses on trees at upper elevations. But we can try to understand some of the fundamental effects of acid rain and ozone," said Kohut.

The three years of tests seem to indicate that the pollutants appear to be decreasing trees' abilities to withstand cold temperatures. In addition, if the acidic deposition dissolves away the waxy covering of the foliage, trees are no longer able to retain moisture.

Kohut said that at many high elevations in the Northeast, pine needles from last summer have turned red and died, a phenomenon called winter kill.

A connection between air pollutants and the death of these trees is suspected because ozone levels and acid deposition are particularly high at these upper elevations. Acid deposition can be 100 times as acidic at high elevations as in sea level rain. At these elevations, acid is deposited on trees by the clouds themselves as they wrap around the top of mountains, undiluted by rain or snow. Although mountain tops do not usually have the high levels of ozone that lower elevations might, when there are moderately high levels it takes longer for them to dissipate.

According to Kohut, although researchers are somewhat concerned that the sugar maple is being hurt by air pollution, they are most worried about pine forests. Smith said that even if the pollutants do not cause visible damage to the trees, the extra stress from acid deposition and ozone may cause the trees to be more susceptible to bacteria and insects.

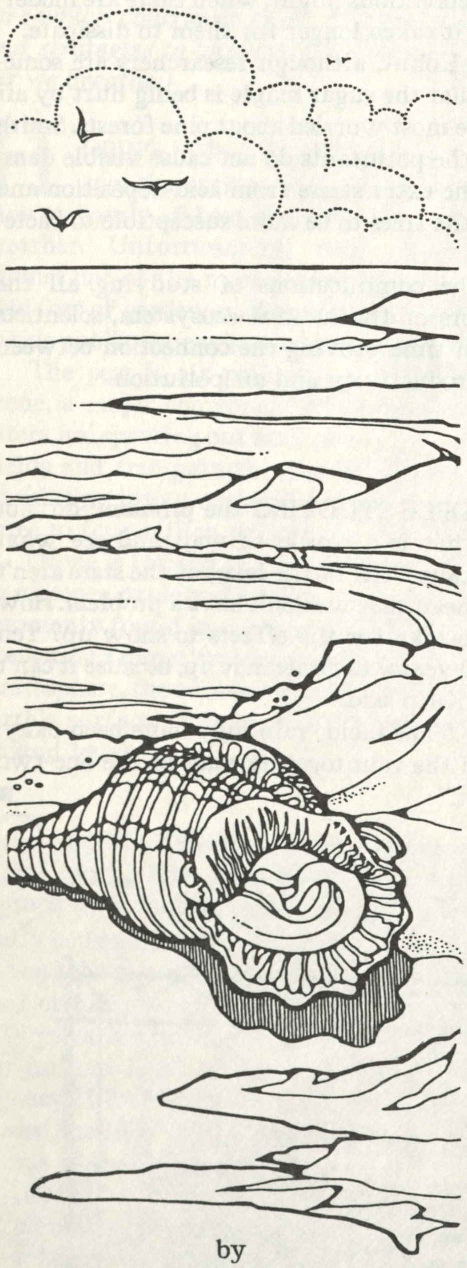
Because of the complications of studying all the stresses and factors of the natural ecosystem, scientists will have a tough time proving the connection between decreased plant productivity and air pollution.

MANY PEOPLE STUDYING the problem do not believe that is a reason to wait and see what happens. "Just because half of the lakes of the state aren't acidified doesn't mean that we don't have a problem. How long is it going to take for the effects to show up? Ten years, 20 years, 50 years? Let's clean it up, because it can't be a good thing," Kulp said.

He continued, "The (acid) rain may have been okay, but the ozone and the rain together may be the one-two punch that does it." ■

Map of the Month

Good News from Long Island Sound



by

Alan Levere

Senior Environmental Analyst

LONG ISLAND SOUND is in the news quite a lot lately. We hear about beaches closed due to medical waste washup, pollution from sewage treatment plant bypasses and overflows, highway runoff after rainstorms, and so on. But pollution is not the only subject being researched in Long Island Sound.

Extensive information points to a Long Island Sound that is one of Connecticut's great natural resources. Secrets of its history, formation, inhabitants, and ability to recover from misuse are the result of research that will continue long after the press forgets today's issues. Two publications will help you find this information.

First, and foremost is the *Long Island Sound Bibliography.* It was prepared by Ralph Lewis in 1985, and includes references to over 1,170 publications. It is divided into six major subject categories: General Information, Environmental Topics, Biology, Geology, Oceanography, and Block Island Sound.

Some of the subsections within these categories are: dredging, flora and fauna, water and groundwater, sea level, erosion, pollution control, waste disposal, plankton, shellfish, marshes/wetlands, sedimentation rates, salinity, and temperature levels. Each of these headings has at least a dozen references cited.

This should be your starting point when you are looking for information about nearly any aspect of Long Island Sound. The *Bibliography* is $2.00.

An excellent companion volume to the *Bibliography* is the *Long Island Sound Directory of Natural Resource Information.* It includes profiles on 96 agencies, groups, and institutions involved within the Sound. The *Directory* is not definitive, but it does provide a valuable starting point for Sound-related inquiry.

Each entry offers the name, address, and phone number of the entity as well as a descriptive portion which should aid in determining which organizations are likely to be the most helpful. The *Directory* was also printed 1985. It is included at no charge with the *Bibliography.*

Saltwater Fishes of Connecticut is a popular reference for many involved in the Sound's fauna (not the least of whom are fishermen). This book brings together descriptions, illustrations, and biologic information on 100 separate species found in the Sound and the mouths of rivers that experience tidal flows.

Each reference offers an illustration, a description that includes fin count and location, mouth size and eye location, overall description, color, habits including where found, its prey, nature and habits of young, general distribution and its overall importance as food or game fish – where applicable.

I find the diversity between the covers of this book rather amazing. And in a time when it is difficult to underscore the strength of diversity, I think you will find the range and nature of these fish, our neighbors, somewhat of a surprise. *Saltwater Fishes* is $4.00.

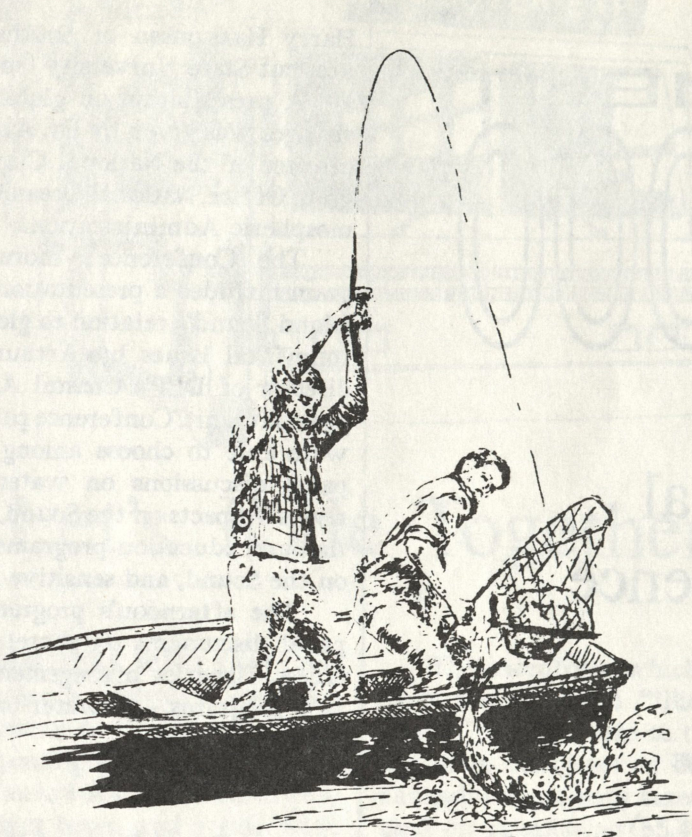
A little more scientifically oriented, *An Annotated Checklist of Connecticut Seaweeds* is a 20-page list of 208 species of red, brown, and green algae, with introduction, checklist, notations, and references. Price: $2.00

The news media will continue to report on what is going wrong with our environment, and is appropriate that that should be the case. But there is another side of the story. Uncovering the mysteries of the Sound and understanding the interactions of the plant and animal life will continue to add strength to the defense and preservation of this valued resource.

To order, please include $2.00 for handling per order (not per item) and eight percent state sales tax. Our address is: DEP-NRC, Map Sales, Room 555, 165 Capitol Avenue, Hartford, CT 06106.

(The cover story in the March 1988 issue of the *Citizens' Bulletin* was a profile of Ralph Lewis' ongoing geologic investigation. We will send a reprint of that article with each order.) ■

Fish Stories



The Northern Pike

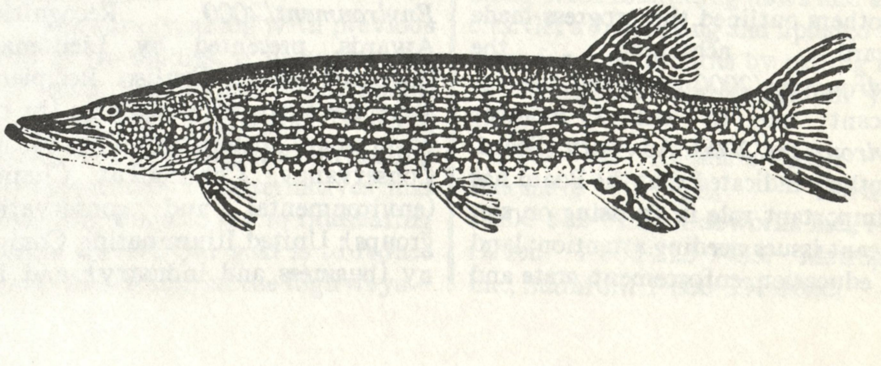
NORTHERN PIKE (*Esox lucius*) are native to northern areas of Eurasia and North America. The species is introduced in Connecticut and is currently found in large numbers only in the Connecticut River and Bantam Lake in the Litchfield/Morris area. It is unknown when or by whom pike were introduced into the Connecticut River. The species was introduced into the Bantam Lake system in 1971 as a means of controlling a stunted white perch population. The northern pike generally inhabits the shallower waters of lakes and rivers, except during mid-summer, when the larger fish move offshore to deeper water. Smaller fish are reported to remain nearshore throughout the summer months.

PIKE IN CONNECTICUT generally spawn during March and April over the vegetation found in flooded marshes. The eggs are quite sticky and adhere to the submerged plants. After hatching the young pike remain attached to the vegetation for six to 10 days prior to starting to feed. When small, northerns feed on zooplankton (microscopic animals) and insects. The fish grow rapidly, however, and quickly switch to a diet primarily consisting of fish. Northern pike in Connecticut are faster growing and shorter lived than those which inhabit more northern climates. Connecticut River pike average 16 inches at age one, 24 inches at age two, and 28 inches at age three. The maximum life span of pike in Connecticut is estimated to be seven or eight years, whereas they can live as long as 25 years in far northern waters.

ANGLERS FISHING for northern pike generally cast or troll artificial lures (large spoons, underwater or surface minnow-shaped plugs) using spinning or bait-casting tackle. Fishing with live bait (large golden shiners or white suckers) is often the favored method of anglers after trophy-sized fish. Northern pike possess many large sharp teeth and a strong leader is recommended. Many anglers prefer to use either a single strand or braided wire leader with a swivel at both ends. Where legal, ice fishing with live bait is also an effective method for catching northerns.

The rod and reel world record northern pike is a 46-pound, two-ounce fish taken from Sacandaga Reservoir, New York, in 1940. However, in Europe commercial fishermen have captured northerns weighing more than 70 pounds in their gill nets. The Connecticut state record pike weighed 29 pounds, one ounce, and was 47 inches long. It was taken in Lake Lillinonah (Brookfield – downriver of the Bantam Lake system) in 1980. The largest pike reported taken from the Connecticut River is a 19-pound, three-ounce, 42-inch-long fish caught in 1986.

(*This article was prepared by the staff of the DEP's Bureau of Fisheries.*) ■



For Your Information

Third Annual E/2000 Conference

by
Martina Delaney
Senior Environmental Analyst

The third annual *Environment/2000* Conference, sponsored by the Connecticut DEP, was held on April 21, 1989. The conference, which attracted over 300 participants, was designed to appeal to representatives of business and industry, environmental advocates, educators, government officials, and private citizens. This year's focus was on Long Island Sound in global, regional, and local contexts. The Conference dealt with the Sound's environmental state of health and the costs associated with its clean up; its potential for shore- and water-based public access; its fisheries and shellfishery resources; and its regulation by various governmental agencies.

DEP Commissioner Leslie Carothers presided. Commissioner Carothers outlined the progress made toward achieving the *Environment/2000* goals and the significant role of the 19-member *Environment/2000* Advisory Board. Carothers indicated that the Board has an important role in focusing on significant issues needing attention: land use, education, enforcement, state and local government coordination, and rivers. The commissioner also announced the formation of a Rivers Advisory Committee to assist in rivers management in the state. The commissioner also signed a "Memorandum of Understanding" for conducting a cooperative effort with the National Park Service, which had just approved a technical assistance grant to assist the state in preparing an assessment of Connecticut's rivers and streams. Connecticut Congressman Bruce Morrison (D-3rd), founder and co-chairman of the Congressional Long Island Sound Caucus, gave the keynote address, "Long Island Sound: A Valuable Resource."

Specially honored were four recipients of the Governor's *Environment/2000* Recognition Awards, presented by Lieutenant Governor Joseph Fauliso. Recipients were the town of East Lyme (in the government category); The Nature Conservancy, Connecticut Chapter (environmental and conservation groups); United Illuminating Company (business and industry); and Dr. Harry Haakonsen of Southern Connecticut State University (education).

A presentation on global climate changes was given by Dr. Alan Hecht, director of the National Climate Program Office, National Oceanic and Atmospheric Administration.

The Conference's morning program included a presentation on Long Island Sound's relation to global environmental issues by Arthur Rocque, director of DEP's Coastal Area Management Unit. Conference participants were able to choose among morning panel discussions on water quality, rivers' impacts on the Sound, information and education programs focusing on the Sound, and sensitive habitats.

The afternoon's program offered panel discussions on shoreline public access, fisheries management, regulatory programs, and water-based recreation.

Panel Summaries

1. *Water Quality and Pollution Controls: How effective and affordable are they?*

2. *Rivers and Freshwater Flows to the Sound: What kind of management do we need?*

3. *Long Island Sound Comprehensive Education and Information Programs: How do we achieve them?*

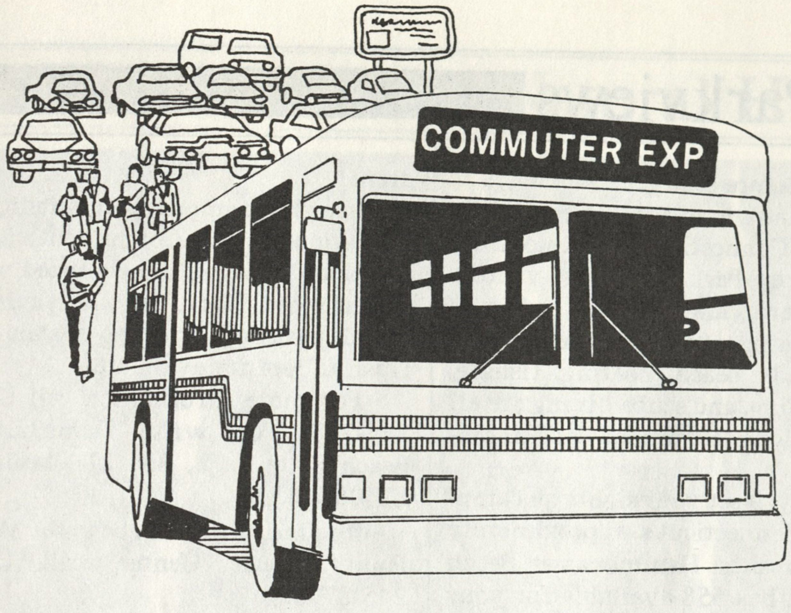
4. *Sensitive Ecological Habitats: How do we acquire and manage them?*

5. *Shoreline Public Access: How do we improve it?*

6. *Fisheries and Fisheries Habitat: How can we better manage them?*

7. *Federal, State, and Local Regulatory Programs: How effective are they?*

8. *Water-based Recreation: Are the needs being met?* ■



Let's Ride Together

COMMUTERS WHO JAM Connecticut's highways daily by driving alone to work may be willing to give carpooling a try if offered such incentives as lower car insurance premiums, lower taxes, and a ride with their co-workers and friends.

Those findings are the result of a survey sponsored by the State Department of Transportation (DOT) to "determine the mind-set of commuters in the state's major traffic pressure-point areas: Fairfield, Hartford, and New Haven counties," DOT Commissioner J. William Burns announced.

The effort is a key component in DOT's response to Governor Bill O'Neill's call for more aggressive management of the state's highways, Burns said.

The extensive telephone survey of 805 commuters was conducted from January through February as part of a statewide marketing communications effort initiated by DOT this year.

"Overall, we found a positive attitude toward ridesharing and a willingness to cooperate," Burns said. "The findings will be used to shape the communications program to promote ridesharing and mass transit as a means to reduce traffic congestion and better manage our transportation resources."

The incentives which most commuters said would "likely or very likely" prompt them to try ridesharing were discounts on car insurance and reduced property taxes on vehicles used for ridesharing (65.4 percent and 62.1 percent respectively) and increased flexibility of mass transit schedules (58.9 percent).

Penalizing solo commuters with higher gasoline or environmental taxes or the elimination of subsidized parking were less favorably received by those surveyed.

THE preferred alternative to driving alone among solo commuters was sharing a ride with a friend (63.9 percent), followed by participation in an employer-sponsored ridesharing program (43.6 percent). Comments by commuters favored ridesharing efforts directed at places of employment.

"The survey, along with previous focus group studies, is providing the DOT with insight into what makes commuters tick," Burns said. "With it, we can be more effective at informing solo commuters of alternatives and persuading them to try to ridesharing or mass transit. Our goal is to reduce the number of cars on the highways — and the resulting congestion — at commuter hours."

"Our researchers tell us that participants in our survey and previous focus groups provided more input and appeared more open-minded toward ridesharing than were residents in other states where similar surveys were performed. That's a good position to start from and a reason to be optimistic," he said.

The survey found that driving alone to work is easily the most popular form of transportation among commuters (81.3 percent). Reasons revolve around independence, convenience, and flexibility.

Another 10.1 percent ride to work with others in one vehicle, 6.9 percent use the train or bus, and 1.7 percent participate in an organized carpool or vanpool program. The major advantages of ridesharing reported in the survey include cost savings and relaxation.

A total of 805 self-identified commuters residing in New Haven, Fairfield and Hartford counties and the city of New London provided complete responses to a telephone survey administered in January and February 1988, from the Mount Vernon Associates telephone bank in New Haven. With a sample size of 805, there is at least a 95 percent chance that the sample statistics fall within a range of plus or minus 3.5 percent of the actual population values.

ONE OF THE NATION'S most successful rideshare matching tools is *The Commuter's Register*. Over 100,000 copies are circulated each month throughout Connecticut and portions of New York. Thousands of prospective car/vanpoolers, as well as transit services that can help you get to and from work, fill *The Register*, along with interesting news and articles. Get a free listing and updated editions for four months by calling any of the rideshare brokerages in your area.

For all rideshare info: The Rideshare Co., Hartford 1-800-842-2150; Rideworks Inc., New Haven 1-800-225-7433. Metropool Inc., Stamford 1-800-331-2040. ■

A Day at the Beach

by
Stephanie Speziale
Writing Intern
Department of English
The University of Connecticut

HAMMONASSET BEACH STATE PARK opened for the first time in 1919, on land acquired before World War I. Additional tracts of land were procured over the years to form what is now a magnificent 919-acre park on the shore in Madison. The park is open to the public year round, as conditions permit, from 8:00 a.m. until sunset.

The park offers visitors a wide variety of relaxing and pleasurable activities. For land-lubbers, wide, open fields are conducive to picnicking, kite-flying, frisbee-tossing, and other athletic endeavors. There are also spectacular beaches for sand and surf enthusiasts, and quiet places for meditation and nature study.

Best known as the largest public beach in Connecticut, Hammonasset Beach State Park provides visitors with a boardwalk, excellent salt water swimming, and two miles of fine, white sandy beach. Boating, fishing, wind-surfing, and scuba diving are all enjoyed along Hammonasset's shorelines.

Have you set your sights on camping? Of Connecticut's approximately 1,500 campsites, Hammonasset Beach State Park has 558 available for your enjoyment. Winding trails throughout the campsites accommodate cyclists, walkers, and hikers.

Hammonasset Beach State Park also participates in the Emergency Stopover Program; out-of-state campers, unable to find overnight lodging, are given a place to stay (for a $6 fee) as a safety measure.

Connecticut's camping season officially begins on April 14 and ends on September 30.

During the summer, Meig's Point Nature Center offers a variety of interpretive activity programs for children.

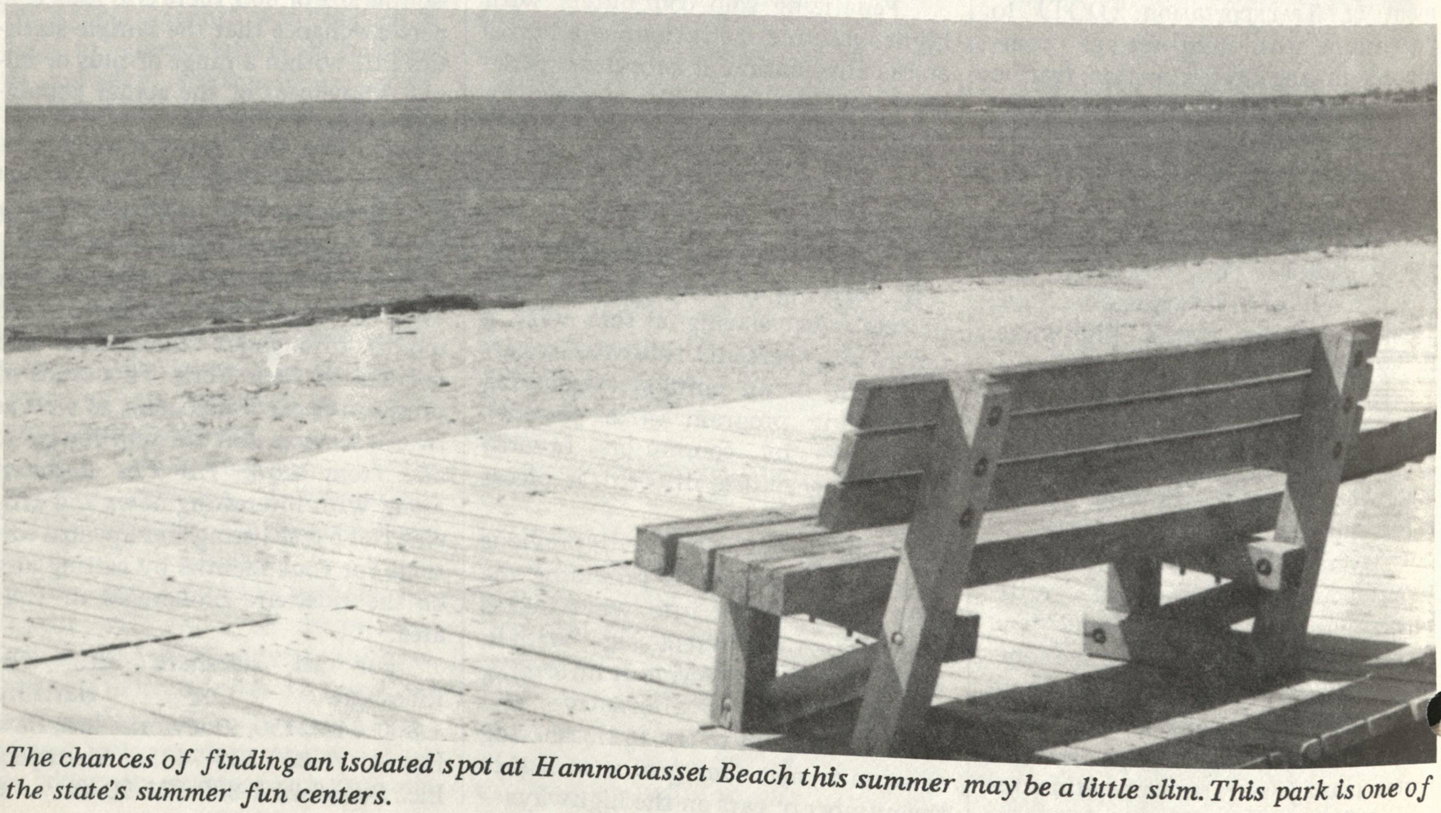
In order to improve accessibility to recreational areas, Connecticut's State Parks and Beaches are equipped with handicapped facilities. A pavilion, paved parking, drinking water, and flush toilets are available.

For more information call (203) 245-2785, or write Hammonasset Beach State Park, Box 271, Madison, CT 06443.

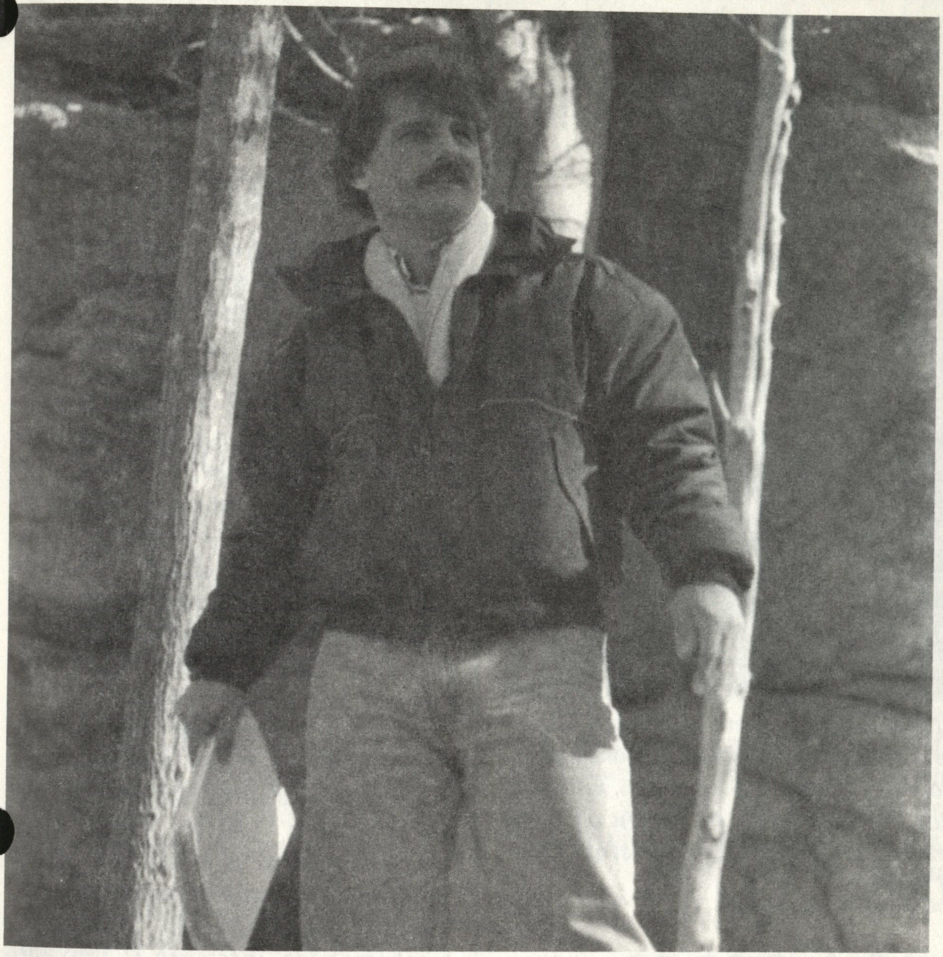
To find out more about the Meig's Point Nature Center, call (203) 245-8743.

Groups wishing to visit Hammonasset by bus must secure a bus permit by calling (203) 566-2304,or writing to the Office of State Parks in Hartford. Contact must be made at least 10 days prior to the visit.

Directions: Hammonasset Beach State Park is 1 mile south of Exit 6 from Route I-95. Or, if coming from the North, take Route 79 and follow Horse Pond Road. ■



The chances of finding an isolated spot at Hammonasset Beach this summer may be a little slim. This park is one of the state's summer fun centers.



Connecticut State Archaeologist Nicholas F. Bellantoni at a prehistoric rock shelter on the Mashantucket Pequot Indian Reservation in Ledyard. Such shelters were used by Connecticut Indians as campsites. (Photo: Kevin McBride.)

Nick Bellantoni and the Temple of Doom

by
George Chartier
University Relations Associate
The University of Connecticut

THE SWASHBUCKLING escapades of Indiana Jones bear no resemblance to the actual work of archaeology, but the movie hero does a good job of promoting the profession, says Connecticut's State Archaeologist Nicholas Bellantoni.

"On the one hand, Indiana Jones makes archaeologists look like treasure hunters, roaming the globe in pursuit of a single artifact when, in truth, we're more like cautious detectives," says Bellantoni, whose office is at The Connecticut State Museum of Natural History at The University of Connecticut.

"On the other hand, the Indiana Jones movies have made students excited enough about archaeology to consider the profession for themselves," he said.

Bellantoni says that, like the movie, archaeology can be "great adventure."

"It concerns me that the Indiana Jones movies seem to encourage people to be treasure seekers and to loot or vandalize archaeological sites," said Bellantoni. "What looks like fun and excitement is really destruction of critical information for real archaeologists," Bellantoni explained.

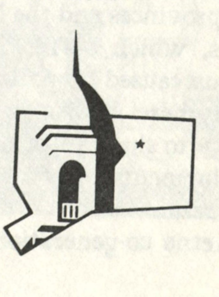
To his credit, movie star Harrison Ford has reportedly recorded public service announcements urging people not to tamper with archaeological sites, according to Bellantoni.

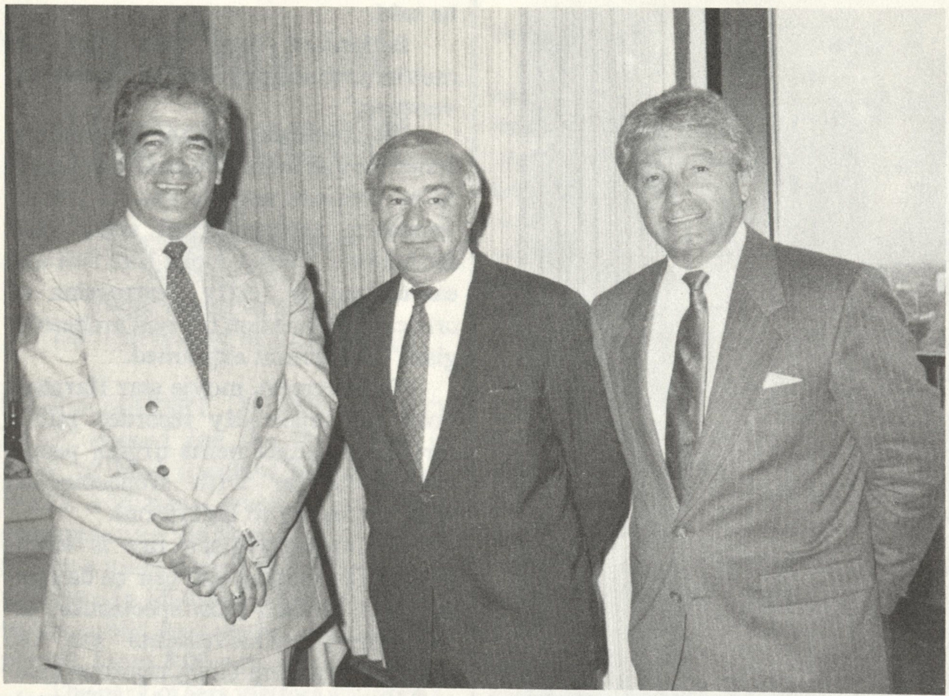
An archaeologist's life is abundantly fascinating and can be dangerous. But, in fact, most spectacular archaeological achievements are the result of grueling labor, rigorous excavation procedures, and scientific analysis.

"A bag of dirt from a site can yield interesting clues about what life was like for people thousands of years ago," said Bellantoni. Wood fragments, tools, or even pebbles help piece together the mystery of who inhabited a place before written history, explained the State Archaeologist.

Connecticut's earliest human inhabitants arrived here 10,000 years ago, and cautious archaeologists all across Connecticut are increasingly able to understand the lives of those who lived here before us.

Bellantoni, became Connecticut's first full-time archaeologist in December 1987. His mandate is to preserve Connecticut's past by helping citizens and their town officials save irreplaceable archaeological sites. During his first year as state archaeologist, Bellantoni worked with over 90 towns and answered thousands of calls from Connecticut citizens. ■





Acid Rain Action Week, sponsored by the New England Governors and Canadian Premiers, demonstrated a joint effort in addressing international environmental problems. Pictured here: (left to right) Gaston Blackburn, minister delegate for the Province of Quebec; Victor Frauenhofer, president of Connecticut Natural Gas; and Robert Middlemiss, parliamentary assistant, National Assembly of Quebec. (Photo: Mary Hart)

Connecticut and Canada Working Together

Gaston Blackburn, Minister-Delegate for the Province of Quebec, toured the Aetna co-generation plant at 490 Capitol Avenue with DEP Commissioner Leslie Carothers.

Blackburn headed a five-member delegation that visited Connecticut to mark the third annual Acid Rain Action Week, sponsored by New England Governors and Eastern Canadian Premiers.

The purpose of the event was to demonstrate the solidarity of the Canadian provinces and the New England states, which suffer from acid precipitation caused by pollution generated elsewhere. It also provides an opportunity to share information and new developments in efforts to deal with acid rain.

The Aetna co-generation plant is an example of a facility that functions efficiently, uses natural gas and reduces sulfur oxide emissions significantly.

"The New England states and Eastern Canadian provinces have taken firm steps to regulate emissions in this area," Carothers said. "More stringent controls across the continent are still needed to solve the problems affecting the northeast."

Commissioner Carothers visited Quebec and participated in a formal ceremony in observance of Acid Rain Action Week, and Mr. Blackburn returned the visit. In addition to touring the Aetna facility, he has met informally with Governor O'Neill, members of the Connecticut General Assembly, and key environmental leaders in the state. ■

Teacher Conservation Award

The Hartford County Soil and Water Conservation District has selected Philip Vacek as the recipient of the NACD/Deutz Allis Conservation Teacher Award in Hartford County. Vacek is a seventh and eighth grade teacher at the Granby Memorial Middle School in Granby.

The District selected Vacek because of his impressive outdoor education program on soils. Vacek co-authored an eight-week program on soils which uses hands-on learning experiences while stressing the importance of our soil resources.

As the winner of the Hartford County award, Vacek will be entered in statewide award competition. The NACD/Deutz Allis Conservation Teacher Award is a national awards program. It aims to promote environmental education by recognizing teachers who integrate it into their classrooms. This year the national winner will win $1,000 cash and a trip to the National Association of Conservation Districts 1990 annual meeting in San Diego.

The Hartford County Soil and Water Conservation District is a nonprofit organization dedicated to protecting natural resources in Hartford County. ■

Ornithological Association

The Connecticut Ornithological Association (COA) is an independent, statewide birding organization formed in 1984. COA strives to promote an interest in Connecticut birds; publish scientifically accurate information about birds; maintain a checklist and records of Connecticut birds; and encourage cooperation within the birding community.

Membership benefits include an illustrated quarterly journal (*The Connecticut Warbler*), a newsletter (*The Bulletin*), and attendance at the annual meeting.

The Connecticut Warbler publishes brief scientific articles; field notes; highlights and summaries of various bird counts; information on birding organizations and locations throughout the state; and book reviews as well as articles of general interest.

The Bulletin provides news, announcements and other notes for COA members.

COA presents a program at its annual meeting for members and guests which is informative on many levels. This event brings the birding community together to share information and experience.

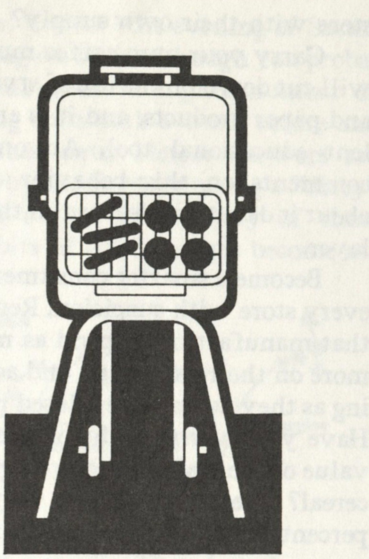
A Rare Records Committee of the COA, formed in 1985, serves as a clearinghouse for the collection and review of bird records. The Committee prepared a checklist of Connecticut birds in 1988.

The Connecticut Rare Bird Alert, co-sponsored by the COA and the Connecticut Audubon council, provides a tape-recorded message that informs interested birdwatchers of recent sightings, giving details and directions to the birds. The phone number (203) 254-3665 is in service 24-hours a day.

For further information, write The Connecticut Ornithological Association, and mail to 314 Unquowa Road, Fairfield, CT 06430. ■

Wanted Woodlot Owners

The Coverts Project, sponsored by the Ruffed Grouse Society and the University of Connecticut Cooperative Extension Service, is looking for woodland owners who want to learn more about their forest and the wildlife that live in it in exchange for a commitment to share that knowledge with others in their communities.



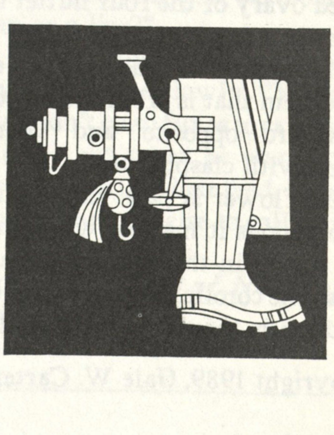
A "covert" is a thicket that provides sheltering habitat for wildlife. The Coverts Project is a training and outreach program in woodland and wildlife management. Participants attend an in-depth, three-day seminar which combines indoor and outdoor training.

All costs of the seminar, including meals, lodging, and educational materials, are covered by the Ruffed Grouse Society, a national organization dedicated to improving the environment for forest wildlife. In exchange for receiving the training, participants are asked to return to their communities and share what they've learned with others. Participants are kept supplied with detailed reference materials that allow them to either answer questions on forest and wildlife management or direct the questioner to the proper professionals.

This year's seminar will be held at the Yale University Forestry Camp on the 6,000-acre Great Mountain Forest in Norfolk, Connecticut, from September 14 to 17. For more information, contact a local Coverts Project Cooperator, a local Extension System office, or Steve Broderick, Extension Forester, at the Extension Center, 139 Wolf Den Road, Brooklyn, CT 06234. Telephone: 774-9600. ■

Archaeological Heritage

The Connecticut state archaeologist, Nicholas F. Bellantoni, and the staff archaeologist at the Connecticut Historical Commission, David Poirier, have received funding from the Connecticut Humanities Council for the initial planning of the traveling exhibit "Preserving Connecticut's Archaeological Heritage." The exhibit will focus on prehistoric, historic, and industrial archaeology. Co-sponsors of the project are the Connecticut State Museum of Natural History and the Connecticut Historical Commission. The following individuals have been hired to develop the exhibit and accompanying brochure for visitors: Loretta Rivers, archaeological consultant; Marion Leonard, historical consultant; Stuart Parnes, exhibit design consultant; and Marina Mozzi, illustrator. Promotional activities, including teacher workshops, will be scheduled during the second phase of exhibit construction. Plans for future exhibit-related materials include a curriculum and other resources for the classroom. A file of similar projects and literature that have been developed for other areas will be made available to educators. If you have information you would like to share, please send it to: Loretta Rivers c/o Office of State Archaeologist, U-23, The University of Connecticut, Storrs, Connecticut 06269-3023, (203)486-5248. ■



Lifestyles

Several years ago, while doing research for a paper called "Putting Belief into Action," I went to the trouble of measuring all sorts of water usage. Here in Bethany, as in many Connecticut towns, we are all on private water supply, so the saving of water is economically as well as environmentally sound. As a result of my investigation, I have now developed the habit of turning off the water while brushing teeth, shampooing hair, and lathering in the shower. I save the water when it is running to heat up, and use that to water houseplants. I find it amusing to pretend that an expensive wine is flowing from my faucets, and I am accordingly stingy with it.

I agree that paper bags beat plastic -- but why use so many bags in the first place? Most businesses have the bag habit, and treat me as an eccentric when I say, "No bag, please!" for small purchases. I'm saving them money too, and if I look funny with my pockets bulging -- should they care? Paper grocery bags may be reused, but how many people do you see entering the store with their own supply?

Carry your own coffee mug. This will cut down on the use of styrofoam and paper products, and it is an excellent educational tool. Anyone who comments on this behavior or asks about it deserves a lecture on the ozone layer.

Become a smarter consumer. Enter every store with suspicion. Remember that manufacturers spend as much or more on their packaging and advertising as they do on the enclosed product. Have you ever thought of the actual value of the grain in the average box of cereal? I fear that it is a very small percentage of the price. Don't fall for overpackaged stuff.

Buying a new car is a major step in anyone's life. If you care about whales, don't buy a Japanese model. If you care about the ozone layer, don't buy a car with air conditioning -- one of the worst sources of damage to the ozone layer. If you care about acid rain, maybe you shouldn't buy a car at all.

Use recycled paper whenever possible. It can be ordered from Earthcare Paper Co., PO Box 3335, Madison, W 53704. Cut down on your junk mail. Write to Direct Marketing Associates, 6 E. 43rd St., New York, NY 10017, and ask to be removed from mailing lists.

Spread the word.

Maryanne Lincoln
Bethany

How often have you walked or driven along a country road and commented on the beer can blight that exists at the roadside? Certainly this toss-away trash mars our environment. During the spring season, my husband and I decided to do something besides complain. Armed with a shopping bag, we augmented our daily walking exercise with waist-bends, as we harvested the crop that no one else wants. Cleaned and turned in at the grocery store can machine, the cans have realized many dollars for our church mission box.

Betty and Cal Martin
Beacon Falls

(*We'd love to hear from other readers with ideas on how we can change ou lifestyles to bring about a cleaner and safer environment.*) ■

Trailside Botanizer

Monkey Flower

by

Gale W. Carter

Monkey flower (*Mimulus ringens*) is a member of the figwort family (*Scrophulariaceae*). It is often mistaken for a mint but it lacks the characteristic odor that many mints have, and its ovary doesn't have the four compartmented ovary or the four nutlet fruit present in mints.

This beautiful plant has an erect square stem that is often branched. Its leaves are opposite and coarsely toothed with clasping bases.

The flower is pale violet, but on rare occasions it may be white. It appears singly in the axils of the upper leaves. The corolla is tubular and two-lipped with the upper lip two-lobed and erect, and the lower lip has three lobes and is broader. The throat is partially closed by two raised yellow ridges. There are four white stamens and single pistil that is also white. The calyx is tinted with dull purple and is five-pointed. Blossoming time is June to September. Its fruit is a many-seeded capsule.

Monkey flower is found growing in wet sites such as meadows, marshes, and along the edges of ponds and streams. It will grow in either partial shade or in the open.

The generic name *mimulus* comes from the Latin word mimus for "buffoon." *Ringens* means gaping. Both words, along with the common name, are references to the face of the corolla which is thought to resemble the face of a grinning monkey.

This native American species has a number of varieties that are used as ornamentals. It is a good plant to fill a spot in a cool, shady wet area of a wildflower garden.

The American Indians and early settlers used its leaves as a green and for poultices for treating wounds.

A related species is the sharp-winged monkey flower (*Mimulus alatus*) but it is not a common in our area. It is similar to *Mimulus ringens*, bu the flowers are short stalked and the leaves are also stalked. The square stem has thin wings along the angles. ■

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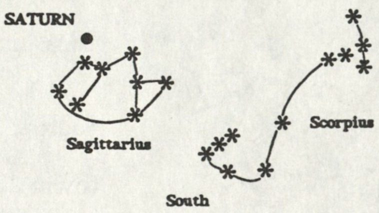
The Night Sky

by
Francine Jackson

SUMMER DAYS ARE SOMETIMES SO HOT that you really don't feel like standing outside for very long. However, after sunset, once the Earth has a chance to start cooling off, you may want to look up at the beauty of the evening sky. And this summer, in addition to the normal array of beautiful seasonal constellations, there are several extra reasons to make yourself comfortable under the stars.

Planetwise, the one considered by many to be the most beautiful is shining brightly in the southern sky. Saturn, the only planet with rings visible from here on Earth, is the extra "star" in the constellation Sagittarius, just above the distinctive teapot. Binoculars will show Saturn to be football-shaped, not roundish as the other planets appear. A telescope will bring the rings to perfect focus.

One of the year's better meteor showers once again returns for your viewing pleasure. The Perseids (named for the constellation Perseus, from which most of these meteors tend to radiate) "peaks" the evening of Saturday, August 12th, although you probably will notice a higher number of shooting stars both a week before and after that date. Meteor showers are caused by the Earth entering a "dirty" portion of its orbit. Many of these small bits of dust and gas become attracted by the Earth's gravity, and attempt to fall to the ground. Most burn up in our atmosphere, never reaching the ground (fortunately for us). We see this burning as a quick flash in the sky, lasting up to a few seconds. Because the moon will be visible for much of the evening, your enjoyment of the shower will not be as great as it could be, but face east and see how well you do, anyway.



Finally, the moon will become totally eclipsed the night of August 16-17. If the night is clear, try to see this. We're very lucky here in New England, because the moon will be visible for the whole eclipse. If you decide to vacation in California that week, the moon will already be in mid-eclipse when it rises. For us, the moon will enter the Earth's primary shadow (the umbra) about 9:21 p.m.; it will be totally within the umbra (totally eclipsed) by 10:20, where it will remain until 11:56. By 12:56 the moon will be completely outside the umbra, and you can go to bed.

Many people believe that, because the moon enters the Earth's shadow, it should become totally black and, therefore, invisible. Surprisingly, the moon often attains a ruddy or a russet color (a product of the Earth's atmosphere). You might try to play hide-and-seek with the moon during its totality. Turn your back to the moon for a few moments, then turn around and see how easy it is to spot. Did it blacken enough to virtually disappear, or is it like a reddish beacon shining amidst the stars? Whichever, I'm sure you'll agree; it was a sight worth losing a little sleep over. ■

Letters to the Editor

I have been an avid reader of your publication for some time. *Connecticut Environment* is a constant source of interesting and helpful information. What sets it apart, however, is the strong naturalistic spririt of the editors and writers. Your editorial on the importance of solitude and especially the quote from Layman P'ang really struck home. Keep up the great work.

Mark Mininberg
New Haven

I enjoy *Connecticut Environment* very much. I usually find the time to read it cover to cover. That's not bad in this day of information overload.

Don J. Kimball
Oxford

My wife and I enjoy your magazine very much. The problems of California and Connecticut are surprisingly similar.

J.E. Brooks
Arcadia, California

It seems to me that you have changed the format in recent issues to mostly nature articles. This is very well done, but former issues did a great service in presenting more potentially controversial subjects and encouraging free exchange of views. This communication can be of great benefit to all.

T.S. Turner
Plymouth, Vermont

Endnote

Some time ago there lived in Stonington a farmer with political aspirations. One day a colleague of his met an old farmer who came from the politician's district and asked: "What do you think of that man out your way? Would you call him an honest man or a liar?"

After stroking his beard, the old man replied slowly, "We-ell, I wouldn't go so fur as to call him a liar — but when he wants his pigs to come for their feed, he has to git somebody else to call 'em."

From *A Treasury of New England Folklore.*

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